AMERICAN MUSEUM NOVITATES

Number 660 — Published by THE AMERICAN MUSEUM OF NATURAL HISTORY New York City — Sept. 15, 1933

59.51, 8 N (74.1)

THE DISTRIBUTION OF ROTIFERA ON MOUNT DESERT ISLAND. III[1]

NEW NOTOMMATIDAE OF THE GENERA *PLEUROTROCHA, LINDIA, EOTHINA, PROALINOPSIS,* AND *ENCENTRUM*

BY FRANK J. MYERS

In this paper the description of new species of Notommatidae collected at Mount Desert Island, Maine, and begun in Part II of this work is continued. As indicated in the title, ten new members of the genera are established, but since this paper is merely a continuation of Part II, the introductory matter there given is not repeated here.

New species (ten in number) described in this paper:

Pleurotrocha thura
Pleurotrocha chalicodis
Pleurotrocha channa
Lindia caerulea
Lindia ecela
Eothina poitera
Proalinopsis gracilis
Proalinopsis phacus
Proalinopsis selene
Encentrum caratum

ORDER **PLOIMA**

Family **Notommatidae**

Pleurotrocha thura, new species

Figure 1

The body is short, stout, and spindle-shaped; its greatest depth is little more than one-fourth of the total length. The integument is quite stiff, and the shape is very constant.

The head is small, and there is a well-marked neck constriction. The trunk gradually increases in depth for about one-half of its length, then tapers to the base of the foot, which is stout and has only one joint. The toes are very short, lanceolate, and acutely pointed.

The dorsal and lateral antennae are minute setigerous papillae in the normal positions.

The corona is oblique and consists of a marginal wreath of cilia with strong lateral tufts adapted for locomotion. The buccal field is evenly covered with short cilia, and the apical area is unciliated. The mouth is near the ventral margin of the corona.

[1]Part I, comprising a faunal list of the rotifers of Mount Desert Island, Maine, appeared in 1931, American Museum Novitates, No. 494, pp. 1–12; Part II, describing new species of Notommatidae of the genera *Notommata* and *Proales*, was published in 1933, American Museum Novitates, No. 659, pp. 1 to 26, Figs. 1 to 14.

The mastax is of the virgate type, and the trophi are very simple. The fulcrum is a long, slender rod, continuing above the base of the rami for some distance and ending in an attenuate, bifid tip.

The rami are placed at right angles to the fulcrum; they are lyrate from the ventral view, and the tips are drawn out into slender points. The unci are two feeble, short, diverging rods. The manubria are undulate and without dorsal or ventral branches.

The gastric glands are small and oval. The stomach of the adult female is crowded with round unicellar algae. The intestine is clear. The ovary and bladder are normal. The foot glands are robust and extend slightly beyond the anal body segment.

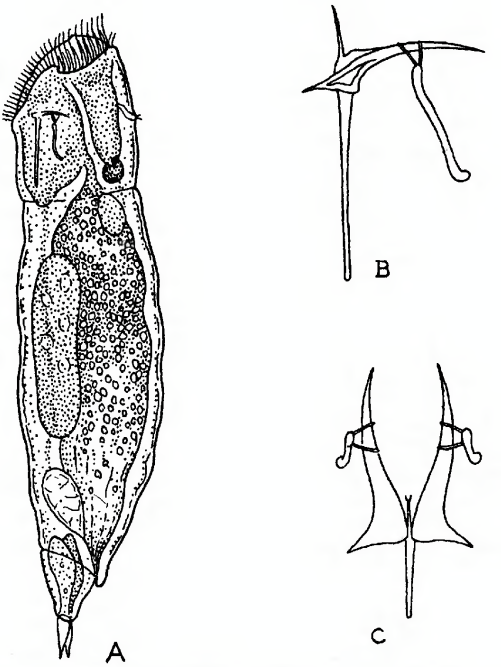

Fig. 1. *Pleurotrocha thura*, new species.
A, lateral view; B, trophi, lateral view; C, trophi, oblique dorsal view.

The retrocerebral sac is small, ductless, and globular; it is rendered opaque by the presence of densely crowded bacteroids. There are no subcerebral glands. The eyespot is situated on the dorsal side of the posterior portion of the ganglion.

Total length, 113–120 μ; toes, 7–10 μ.

HABITAT.—Submerged aquatic vegetation in acid-water associations.

Pleurotrocha thura is common on Mount Desert Island; Vilas County, Wisconsin; and Atlantic County, New Jersey.

While Harring and Myers (1924, Trans. Wis. Acad. Sci., XXI, p. 458) state, in their definition of the genus *Pleurotrocha*, that there is

no trace of a retrocerebral sac, yet, due to the presence of other combined characters, this rotifer is placed in that genus. The retrocerebral sac and the cervical eyespot suggest its affinities with the genus *Notommata*, while this type of modified virgate mastax is common in the genus *Monommata*.

The swimming habit of *Pleurotrocha thura* is very characteristic. Locomotion is achieved by a series of short jumps followed by intervals of smooth gliding. *Pleurotrocha robusta* (Glasscott) has been observed to swim in the same manner.

De Beauchamp (1909) interpreted the presence of algae in the stomach walls of certain rotifers as a case of symbiosis. Remane (1929) has shown that in many instances, where the walls of the stomach are composed of syncytial cells, the presence of algae is due to intracellular digestion, as opposed to extracellular, the usual mode among rotifers. De Beauchamp (1932) has pointed out that algae can live for several days in the walls of the stomach before disintegrating. In the case of *Pleurotrocha thura*, intracellular digestion is rudimentary, as the rotifer has gastric glands. Rotifers, in which intracellular digestion is primary, have several large caeca forming part of the stomach, the gastric glands being absent.

Pleurotrocha chalicodis, new species

Figure 2

The body is short and stout; its greatest depth is about one-fourth of the total length. The integument is soft and flexible, but the outline is quite constant.

The head is very large and long, being nearly one-third the total length of the animal. There is a marked diminution of the body depth starting at the neck fold, whence it tapers gradually to the very small tail. The foot is relatively stout and obscurely two-jointed. The toes are short; they are somewhat enlarged at the base, whence they diminish gradually, ending in papillose tips.

The corona is normal, and the buccal plate continues down the ventral side for some distance.

The dorsal antenna is a small setigerous papilla; the lateral antennae were not observed.

The mastax is a modification of the virgate type. The rami are slender and lyrate from the ventral view, and there is no denticulation on their inner margins. The fulcrum is a straight, slightly tapering lamellar plate, enlarged at the posterior end. The unci are extremely small rods, resting on the tips of the rami. The manubria are very slender and curved; near the posterior end there is an irregular enlargement with ventrally projecting lamella. The epipharynx consists of two large, very thin, oval plates, the points of which project slightly through the mouth opening.

The gastric glands are very large and reniform. The stomach and the clear intestine are separated by a shallow constriction. The ovary is quite large and there is no bladder, the cloaca functioning instead. The foot glands are slender and club-shaped.

The ganglion is ovate, and there is a clear, round, ductless retrocerebral sac attached to its posterior end; it encloses the lunate eyespot.

Total length, 130 μ; toes, 10 μ.

HABITAT.—Marginal detritus in acid-water associations.

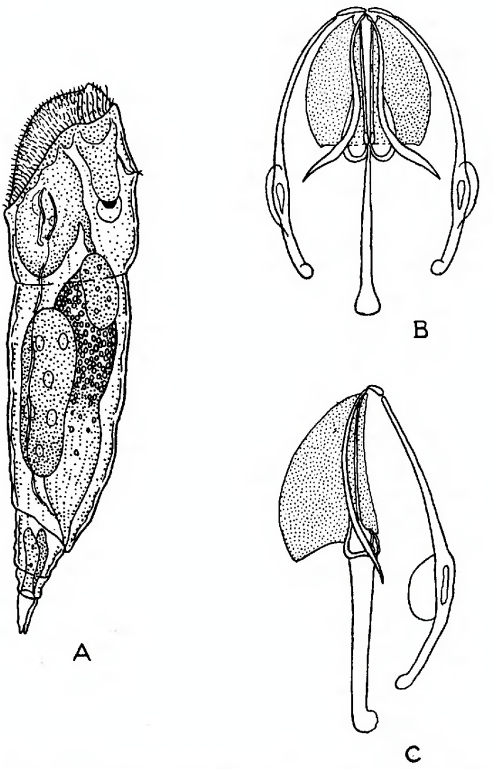

Fig. 2. *Pleurotrocha chalicodis*, new species.
A, lateral view; B, trophi, ventral view; C, trophi, lateral view.

Pleurotrocha chalicodis was found, during several summers, in the wide-spread connecting Long Lake and Somes Pond. It was also collected in a cranberry bog near Mays Landing, Atlantic County, New Jersey. Its nearest relative is probably *Pleurotrocha trypeta* (Harring and Myers). Although the trophi of these rotifers have a certain resemblance, the very large head, the presence of a retrocerebral sac, the large gastric glands, and the shape of the toes of *Pleurotrocha chalicodis*, readily separate it from the remaining species of the genus.

While *Pleurotrocha trypeta* is parasitic in *Gomphosphaera*, *Pleurotrocha chalicodis* is probably not parasitic. At least, all the specimens found were free and without indications of any host.

Pleurotrocha channa, new species

Figure 3

The body is very elongate, slender, and tapering; its greatest depth is about one-sixth of the total length. The integument is very thin and flexible, and the outline is constantly changing with the incessant contortions of the individual.

The head is relatively small and truncate anteriorly; it is separated from the trunk by a well-marked constriction. The greatest depth is just back of the neck fold, whence the abdomen gradually diminishes to the minute tail. The foot is fairly long, tubular, and obscurely two-jointed. The toes are short; their inner margins are straight and the outer edges swollen, whence they diminish abruptly to papillose tips.

The dorsal antenna is a small setigerous papilla; the lateral antennae were not observed.

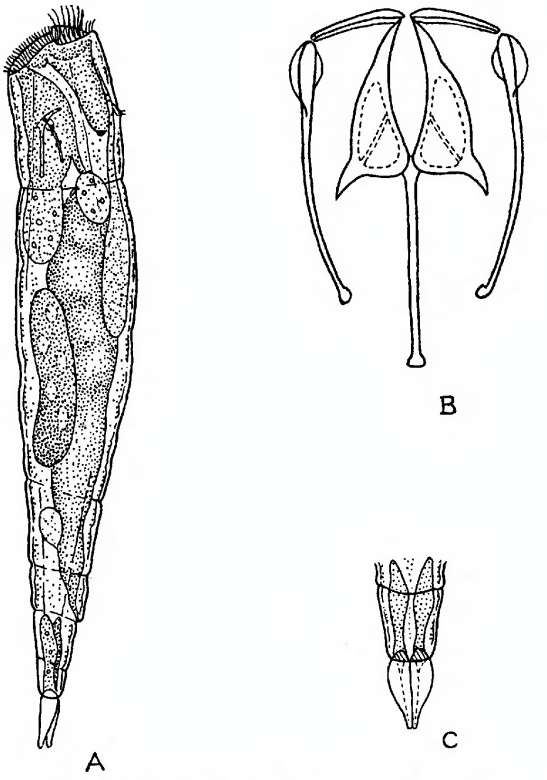

Fig. 3. *Pleurotrocha channa,* new species.
A, lateral view; B, trophi, ventral view; C, toes, dorsal view.

The corona is nearly frontal. The ciliation of the buccal field is short and dense; it does not extend ventrally beyond the mouth. The apical plate is unciliated and rather small.

The mastax is a modification of the virgate type. The fulcrum is long and slender, the posterior end being enlarged. The rami are triangular and without denticulation on the inner margins; the dorsal portion is inclined but not bent at a right angle, as

in the normal virgate type. Each uncus has two slender teeth, clubbed near the tips. The manubria are long, and the basal plate is very small and oval.

There is a pair of large salivary glands attached to the lobes of the mastax. No constriction separates the stomach from the intestine. The gastric glands are small and oval. The ovary is normal, and there is a very small bladder. The foot glands are club-shaped and nearly as long as the foot.

The ganglion is large and saccate with a small eyespot situated on its posterior edge. The retrocerebral sac is indistinctly vacuolated and exceptionally long, extending posteriorly for nearly one-half the length of the trunk.

Total length, 152–155 μ; toes, 12–15 μ.

HABITAT.—Submerged sphagnum in acid-water associations.

Pleurotrocha channa is evidently rare. A few individuals were collected in Aunt Bettie Pond during the summer of 1924; it has not been found since. The pumping action of the mastax is reduced, as indicated by the long, slender fulcrum, the nearly straight incus, and the small basal plates of the manubria. All of these are developed in the virgate type as supports for the walls during pumping action. However, in *Pleurotrocha channa* there are two long teeth in each incus, also a well-developed retrocerebral sac, both of which point toward the genus *Notommata*. Therefore, this species might well be considered as an intermediate type. The elongate, tapering body, the exceptionally long retrocerebral sac, and the shape of the toes are enough to identify it at once.

Lindia caerulea, new species

Figure 4

The body is very long, slender, and fusiform; its greatest width is slightly more than one-sixth of the total length. The integument is very flexible, and the outline varies greatly with the state of contraction.

The head segment is short, and the transverse neck fold is well marked. The abdomen is almost cylindric and tapers gradually from a point opposite the gastric glands to the base of the toes. There are three distinct transverse skin folds: one just to the rear of the gastric glands; one opposite the junction of the stomach with the intestine; and one in front of the bladder. The tail is small and has one round lobe. The foot is continuous with the body outline and is indistinctly two-jointed. The first joint is very long, and the terminal joint is very short. The toes are slender and outcurved from the dorsal view; from the lateral view, they are stout and parallel-sided, diminishing abruptly to blunt tips.

The dorsal antenna is a small setigerous papilla in the normal position; the lateral antennae were not observed.

The corona extends down the ventral side about one-third the length of the body, the postoral section being long and slender.

The mastax is of the cardate type. The rami are lyrate from the ventral view and have well-developed alulae. The fulcrum is a subsquare plate of the same length as the rami. Each uncus has one stout functional tooth, followed by a much smaller

accessory directly attached to the principal tooth by a short, curved prolongation. Each manubrium has a large, crescent-shaped anterior branch. The median branch is stout and slightly incurved; the dorsal branch is lamellar and curved outward. The epipharynx consists of two elongate plates, the posterior margins of which are bifid.

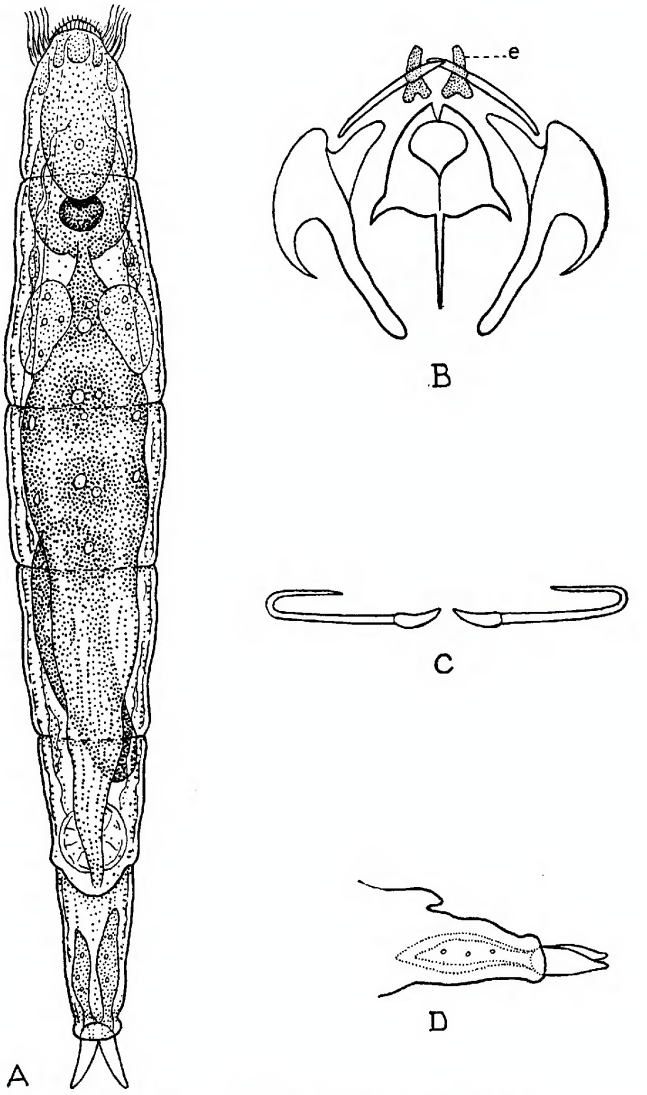

Fig. 4. *Lindia caerulea*, new species.

A, dorsal view. B, trophi, ventral view: *e*, epipharynx. C, unci, frontal view; D, toes, lateral view.

The gastric glands are large and pyriform. The stomach and intestine are indistinctly separated. The bladder is small, and the ovary is normal. The foot glands are robust, the right gland being larger than the left.

The retrocerebral organ is reduced to a small, ductless sac filled with red pigment granules and encloses the eyespot, which is situated at the posterior end of the ganglion.

Total length, 400 μ; toes, 18 μ.

HABITAT.—Among *Nitella* and *Bactrachospermum* in permanent bodies of acid water.

Lindia caerulea is evidently rare. It was first found associated with *Lindia ecela* Myers, in the Witch Hole. It was present for several summers wherever *Nitella* and *Batrachospermum* were to be found. It differs from *Lindia ecela* Myers and *Lindia producta* Harring and Myers, in its much smaller size, in the unequal foot glands, in the general shape of the body, and in the elements of the trophi and the different toes.

Lindia ecela, new species

Figure 5

The body is elongate, cylindric, and slender; its greatest width is about one-fifth of the total length. The integument is very flexible, and the outline varies greatly with the state of contraction.

The head is small and the neck fold obscurely marked. The abdomen is swollen posteriorly and tapers rather abruptly to the small, round tail. The foot is extremely short, being only as long as the toes, which are small and acute.

The dorsal and lateral antennae are minute setigerous papillae in the normal positions.

The corona extends down the ventral side nearly one-third the length of the body, the posterior portion being very long and slender.

The mastax is of the cardate type. The rami are lyrate, and their external edges are provided with a thin lunate extension. The fulcrum is a subsquare plate, being about as long as the rami. Each uncus has one long, slender ventral tooth and a smaller accessory, united by a weblike plate. Each manubrium has a large, crescent-shaped anterior branch. The dorsal branch is undulate and curves inward. The epipharynx is composed of two irregularly shaped plates, the inner edges of which are very finely denticulate.

The gastric glands are reniform and of moderate size. The stomach and intestine are indistinctly separated. The bladder is normal and the ovary large and elongate. The foot glands are relatively short and slender.

The retrocerebral sac is round and ductless; it is filled with red pigment granules and encloses the eyespot, which is situated at the posterior end of the ganglion.

Total length, 570 μ; toes, 32 μ.

HABITAT.—Among *Nitella* and *Batrachospermum* in permanent bodies of acid water.

Lindia ecela was fairly common in small bodies of acid water, during the summer of 1927, in association with *Nitella* and *Batrachospermum*. It evidently feeds on blue-green algae, as the stomach is always colored a bright tint of blue. This species is closely related to

Lindia producta Harring and Myers, from which it differs in the shape of the toes, the presence of a well-developed epipharynx, and in the elements of the trophi.

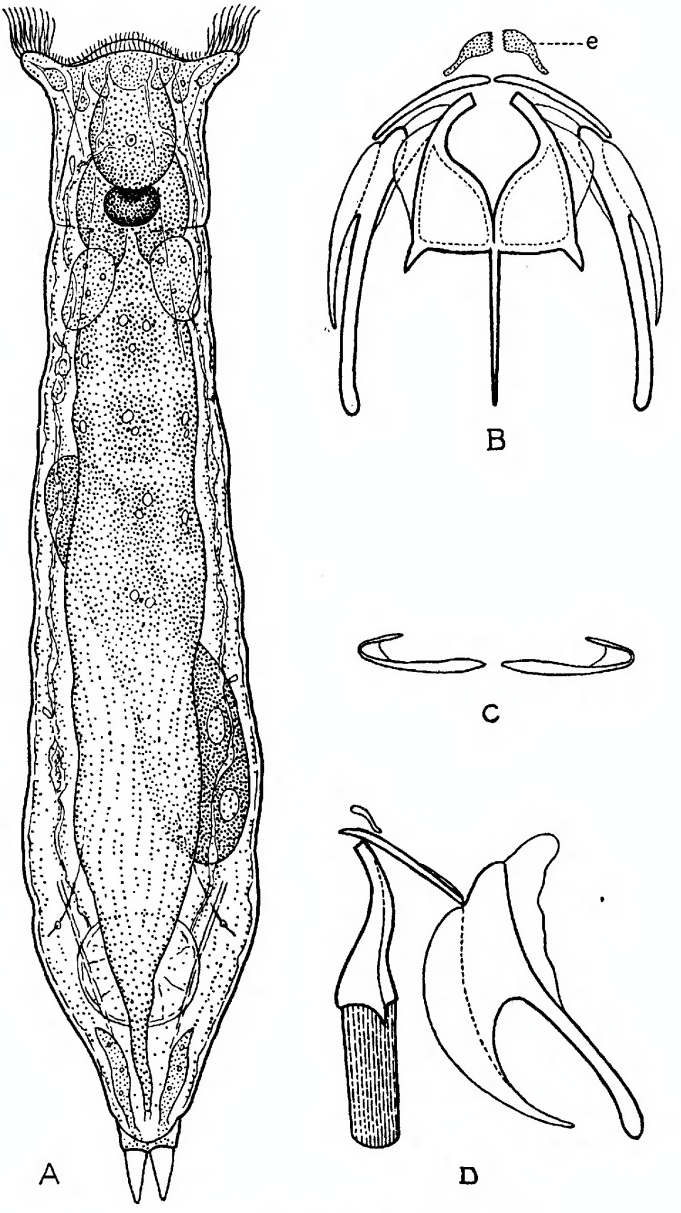

Fig. 5. *Lindia ecela*, new species.

A, dorsal view. B, trophi, ventral view: *e*, epipharynx. C, unci, frontal view; D, trophi, lateral view.

Eothina poitera, new species

Figure 6

The body is short, stout, and cylindric; its greatest width is slightly less than one-fifth of the total length. The animal is hyaline and the integument very flexible, the outline changing constantly with the contortions of the individual.

The head is short and stout; the transverse folds limiting the neck segment are well marked. The abdomen is nearly parallel-sided for about two-thirds of its length, then tapers abruptly to the base of the toes. The foot is very short and has

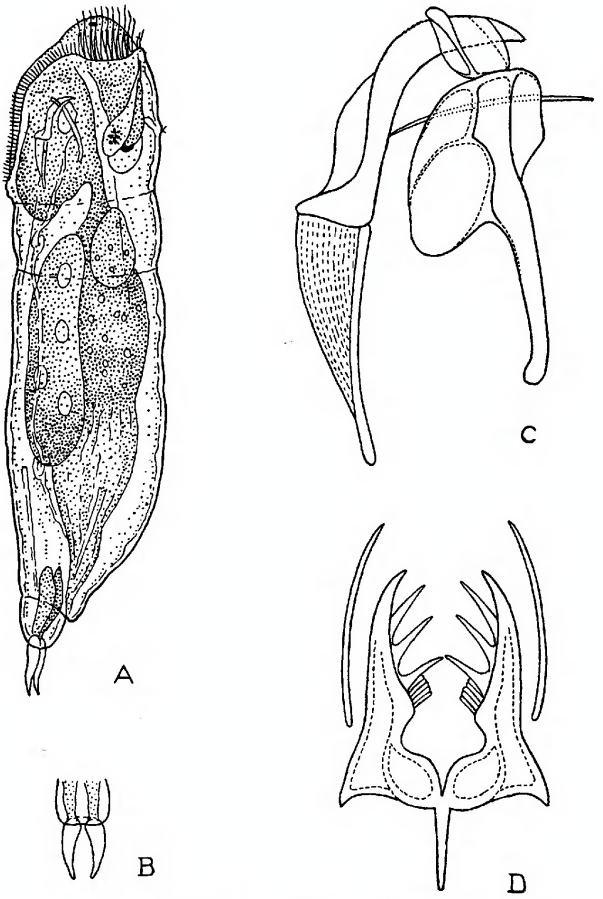

Fig. 6. *Eothina poitera,* new species.
A, lateral view; B, toes, dorsal view; C, trophi, lateral view; D, trophi, oblique frontal view.

only one joint. The toes are narrow and undulate from the lateral view; from the dorsal view, they have enlarged bases which diminish gradually to acute, incurved tips.

The dorsal and lateral antennae are minute setigerous papillae in the normal positions.

The corona extends down the ventral side about one-fourth the length of the body. The unciliated apical area is strongly convex; the buccal plate has a well-marked median depression in which the mouth is situated. The marginal ciliation is short, except on the two lateral arcs which have long cilia adapted for locomotion.

The mastax is of a specialized virgate type. The fulcrum is broad at the base and tapers gradually to a slender, rodlike posterior section. The rami are triangular and symmetrical; there is a heart-shaped opening just above the fulcrum; this is followed by four or five short, slender, and three very long, acute teeth, situated on the dorsal portion of each ramus. Each uncus has a single, strong tooth attached to a weblike plate. The anterior expanded portion of each manubrium is large and roughly oval; the median branch is nearly straight and has a slight terminal expansion. Two slender rods are imbedded in the walls of the mastax just below the posterior edges of the rami; they serve as supports during pumping action.

The stomach and intestine are separated by a slight constriction. The gastric glands are large and pyriform. The cloaca functions as a bladder. The foot glands are long and slender.

The retrocerebral sac is small, clear, and pyriform. The subcerebral glands are nearly as long as the sac and always contain a round cluster of bacteroids at the level of the eyespot. There are two accessory frontal eyespots on the apical area, in addition to the cervical eyespot at the posterior end of the ganglion.

Total length, 190–220 μ; toes, 13–18 μ.

HABITAT.—Among decaying *Utricularia* on the surface of a small stream.

Eothina poitera is evidently rare. It was collected only in the Barcelona, a meandering, flood-plain stream, which drains a large marsh and empties into Frenchman's Bay.

The principal differences between the species of the genus *Eothina* are:

Eothina elongata (Ehrenberg).—Body elongate, slender; foot long, two-jointed; toes straight and stout; tips of rami with numerous close-set teeth; bladder present; total length, 350–400 μ.

Eothina tryphaea Harring and Myers.—Body moderately elongate; foot short and broad, two-jointed; toes slender, bulbous enlargement at bases; rami armed with numerous needle-like teeth extending from base to apex; bladder absent; total length 175–250 μ.

Eothina argus Harring and Myers.—Body moderately elongate; foot short and narrow, two-jointed; toes of medium length, slender and conical; rami with four or five stout teeth just below apex; bladder absent; total length, 250–300 μ.

Eothina poitera Myers.—Body short and stout; foot short, one joint; toes short and undulate from the lateral view; tips of rami with three prominent long teeth; bladder absent; total length 180–200 μ.

Proalinopsis gracilis, new species

Figure 7

The body is slender and tapering; its greatest depth is about one-seventh of the total length. The integument is flexible, but the general outline of the body is fairly constant.

The head and abdomen are separated by a well-marked constriction. The head segment is somewhat longer than wide and convex anteriorly. The abdomen is deepest near the middle, whence it tapers gradually to the tail, which is a small, knoblike papilla bearing a long, stiff spine. The foot is long and slender, the terminal joint being only one-fourth the length of the basal. The toes are of medium length and end in drawn out, acute tips.

The dorsal antenna is a small setigerous papilla; the lateral antennae were not observed.

The corona is an elongate oval area covering the oblique anterior surface of the head and terminating on the ventral side a short distance below the mouth. The marginal cilia are short, with the exception of the two lateral auricle-like arcs, which are provided with long cilia. The unciliated apical area is small, and the buccal plate is evenly ciliated.

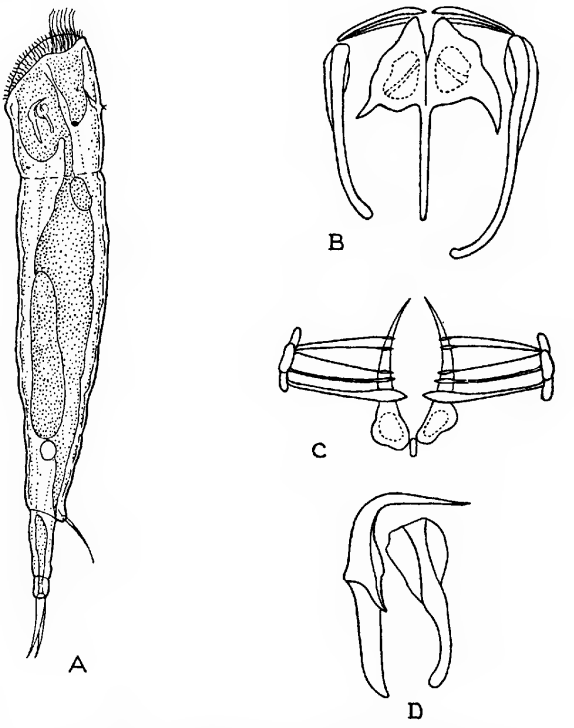

Fig. 7. *Proalinopsis gracilis*, new species.

A, lateral view; B, trophi, ventral view; C, trophi, frontal view; D, incus and manubrium, lateral view.

The mastax is of the virgate type, its primary function being evidently suction by pumping. The fulcrum is of moderate length and approximately parallel-sided. The rami are roughly triangular from the ventral view and without denticulation on the inner edges; the left alula is much longer than the right. Each uncus has one strongly developed ventral tooth, followed by four weaker accessories. The manubria are asymmetric, and the tips of the median branch are incurved.

The esophagus is long and slender. There is no constriction between the stomach and the intestine. The ovary is long, and the bladder is minute. The gastric glands are nearly as long as the foot.

The ganglion is normal and has a small, round eyespot, placed somewhat ventrally, attached to its posterior end.

Total length, 133–140 μ; toes, 15–18 μ.

HABITAT.—Ponds among submerged aquatic vegetation.

Proales gracilis is quite common on Mount Desert Island; Atlantic County, New Jersey; Villas County, Wisconsin; and Montgomery County, Pennsylvania. Its nearest relative is *Proalinopsis phacus* Myers, from which it is readily distinguished by the normal dorsal antenna; the foot, the ultimate joint of which is very short and unwrinkled; and by the differences in the trophi.

Harring and Myers (1924, *op. cit.*, p. 440) in their description of *Proales staurus*, state that there is no eyespot present. Later research has shown that the species has an eyespot; sometimes it is very pale and hard to see, but always present. Therefore, so far as is known, all species of the genus have a cervical eyespot.

Proalinopsis phacus, new species

Figure 8

The body is extremely slender and tapering; its greatest depth is about one-seventh of the total length. The integument is very flexible, and the outline varies greatly with the contortions of the individual.

The head and abdomen are separated by a shallow constriction, whence the body tapers gradually to the tail, which is a prominent knoblike papilla bearing a very short curved spine. The foot is extremely long and slender; it is composed of two joints of equal length, the terminal one being transversely wrinkled. The toes are bulbous at the base, then diminish suddenly and end in very slender drawn-out tips.

The dorsal antenna is a large knoblike elevation in the normal position; the lateral antennae were not observed.

The corona is oblique and terminates just below the mouth. The ciliation is normal, and the two lateral arcs of locomotor cilia are exceptionally long.

The mastax is a modification of the virgate type. The rami are asymmetric and without teeth on the inner margins; the posterior portion is at a right angle to the fulcrum, suggesting that pumping is the primary function and that the grinding of food is secondary. The fulcrum is long and gradually tapers to the posterior tip. Each uncus has four long slender teeth, clubbed at the tips, and decreasing in size toward the posterior margin. The manubria are asymmetric. The left manubrium is very long and incurved near the tip; the right is short and nearly straight.

The esophagus is long and slender. There is a slight constriction between the stomach and the intestine. The ovary is normal and the bladder minute. The gastric glands are small and reniform. The foot glands are very long, extending almost to the level of the anal segment.

The ganglion is short and stout; there is a very small round eyespot attached to its posterior end.

Total length, 165–175 μ; toes, 15 μ.

HABITAT.—Submerged sphagnum in acid-water associations

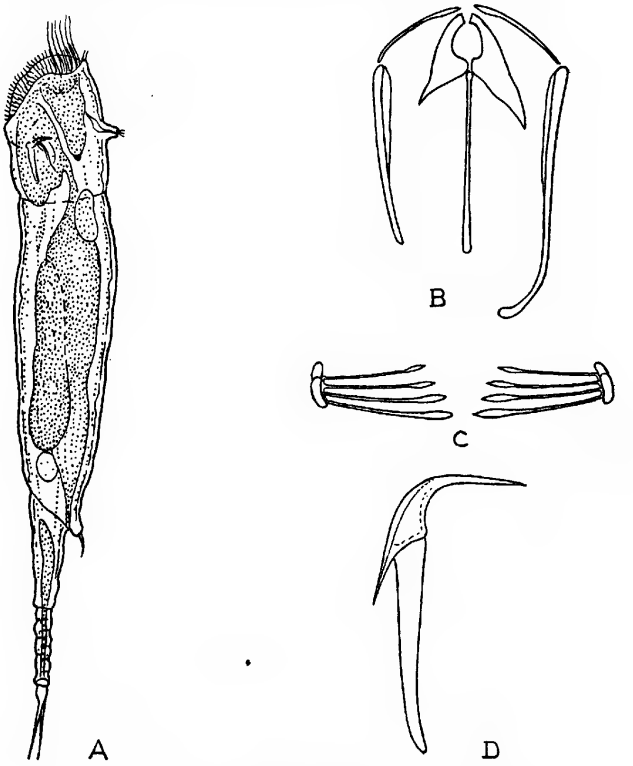

Fig. 8. *Proalinopsis phacus*, new species.
A, lateral view; B, trophi, ventral view; C, unci; D, incus, lateral view.

Proalinopsis phacus is evidently rare. A few specimens were collected in the Witch Hole, Mount Desert Island, and later, in Lenapi Lake, Atlantic County, New Jersey. The very long slender foot, the peculiar toes, bulbous at the base, the very short tail-spine, and the prominent dorsal antenna, separate this readily enough from the remaining species of the genus.

Proalinopsis selene, new species

Figure 9

The body is slender and fusiform; its greatest depth is somewhat over one-sixth of the total length. The integument is very flexible, and the outline constantly changes with the conto rtions of the animal. The entire body is very hyaline.

The head and abdomen are separated by a slight constriction. The head segment is somewhat longer than wide and subprone anteriorly. The abdomen is cylindric and parallel-sided; posteriorly it tapers gradually to the tail, which is a small knoblike papilla bearing a short, stiff, spindle-shaped spine. The foot is short and stout, appearing to have but one joint. The toes are slightly decurved, rather enlarged at the bases and tapering to slender acute tips.

The dorsal antenna is a small setigerous papilla; the lateral antennae were not observed.

The corona is nearly ventral and terminates a short distance below the mouth. The marginal cilia are short, with the exception of the usual lateral auricle-like arcs. There is a small unciliated apical area, and the buccal plate is evenly ciliated.

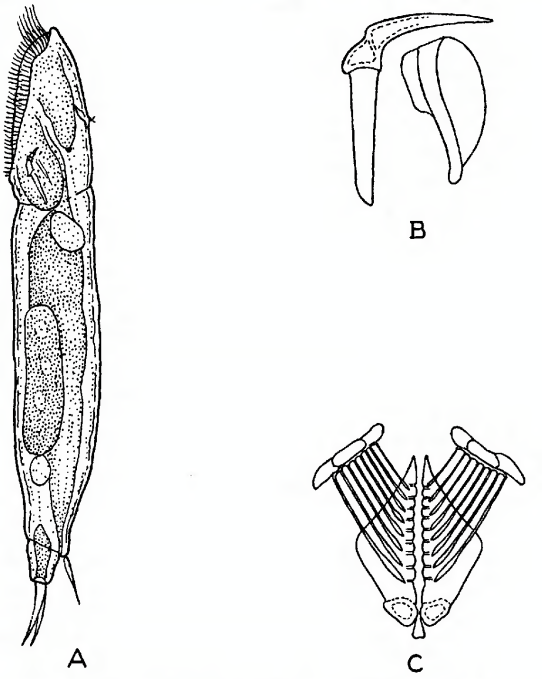

Fig. 9. *Proalinopsis selene*, new species.
A, lateral view; B, incus and manubrium, lateral view; C, trophi, frontal view.

The mastax is of a type intermediate between the malleate and the virgate, the primary function being equally divided between pumping and the crushing of food. The rami are symmetric and triangular; the posterior portion is bent at a right angle to the fulcrum, which is long and tapering, with no marked enlargement of the posterior end. Each incus has eight long slender teeth, clubbed near the tips; they decrease in size toward the posterior margin. The manubria are short and stout; the dorsal cell continues almost to the posterior end as a broadly curved plate.

The esophagus is evanescent. The ovary is normal and the bladder very small. The gastric glands are oval and of medium size. The foot glands are small and club-shaped.

The ganglion is long and carries a small eyespot attached to its posterior end.
Total length, 90 μ; toes, 15 μ.
HABITAT.—Among algae in acid-water associations.

Proalinopsis selene seems to be rare, but this may be on account of its small size and secretive habits. A few specimens were collected in the Witch Hole and Lower Breakneck Pond. The small size, the prone corona, the lanceolate "tail-spine," and the short, single-jointed foot separate it readily enough from the remaining species of the genus.

Encentrum caratum, new species

Figure 10

The body is elongate, very slender, and slightly gibbous dorsally; the venter is nearly straight. The integument is very flexible, but the outline, fairly constant.

The head is very long and marked by several dorsal skin folds; it is separated from the abdomen by a well-marked neck constriction.

The antennae are minute and in the normal positions.

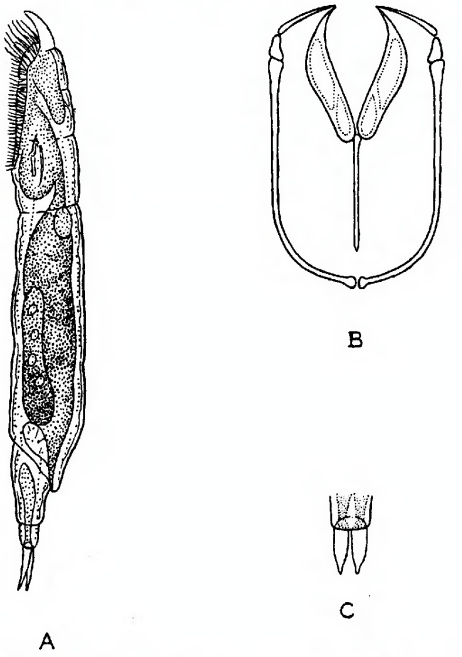

Fig. 10. *Encentrum caratum,* new species.
A, lateral view; B, trophi, ventral view; C, toes, dorsal view.

The corona is ventral, nearly as long as the head and has prominent lateral tufts of long cilia adapted for locomotion. The rostrum is very large, rounded anteriorly, and decurved.

The abdomen is cylindric and tapers rather abruptly, from over the lumbar region, to the minute tail. The integument is without longitudinal divisions, but the

oblique, circular skin fold, which usually limits the plates posteriorly, is well marked. The foot is composed of two joints, the terminal being only one-half the length of the basal. The toes are short, slender, and tapering; from the dorsal view, they appear stout and parallel-sided, diminishing abruptly to papillose tips.

The trophi are of the forcipate type. The rami are nearly parallel-sided and taper to acute, slightly incurved points. No alulae are present. The fulcrum is a long, slender plate. The unci are short, and a triangular intramalleus articulates with the long manubria, which nearly meet beneath the posterior tip of the fulcrum.

The gastric glands are very small and oval. The stomach and intestine are not distinctly separated. The ovary and bladder are normal. The foot glands are very long, slender, and slightly club-shaped

The ganglion is saccate, and there is no retrocerebral sac nor are there any subcerebral glands. There are no indications of eyespots.

Total length, 145 μ; toes, 12 μ.

HABITAT.—Marginal sphagnum in acid-water associations.

Encentrum caratum is fairly common on Mount Desert Island and in Atlantic County, New Jersey. It is related to *Encentrum elongatum* Harring and Myers, from which it differs mainly in the shape of the toes, the extremely large rostrum, the asbence of a retrocerebral sac, and the variations in the trophi.

Judging from our present limited knowledge about rotifers, taxonomy and the study of geographical distribution is still of primary importance and will continue to be so until a much greater number of species, still unknown, are found and described. In fact, this is the foundation on which future studies must be based. Not until a great majority of the rotifers have their minutest variations classified and the details of their distribution tabulated will the idea that species are real and definite units, sharply marked off from other kinds of units, be established. There do exist some sharply circumscribed species, but other species intergrade with one another. There is no crucial test by which we can distinguish between a local race, a variety, and a species. There is often disagreement between systematists themselves as to whether a particular kind of rotifer shall be classified as a full species or a mere variety. There exist groups so variable that the extremes of variation would be regarded as different species did we not have a series of intermediates. It is only by intensive collecting and research that these variations are to be found and the affinities between certain groups brought to light.

New species of other genera of the Rotifera will be described in Part IV of the 'Distribution of Rotifera on Mt. Desert Island' and will appear in American Museum Novitates.

BIBLIOGRAPHY

BEAUCHAMP, P. DE. 1909. 'Rechèrches sur les Rotifères. Les formations tégumentaires et l'appareil digestif.' Arch. Zool. Expérim., X, pp. 1–410, Pls. I–IX, text figs.

1932. 'Contribution à l'étude du genre *Ascomorpha* et des processes digestifs chez les Rotifères.' Bull. Soc. Zool. France, LVII, pp. 428–449, text figs.

HARRING, H. K., AND MYERS, F. J. 1922. 'The rotifer fauna of Wisconsin.' Trans. Wis. Acad. Sci., XX, pp. 553–662, Pls. XLI–LXI.

1924. 'The rotifer fauna of Wisconsin, II. A revision of the notommatid rotifers, exclusive of the Dicranophorinae.' Trans. Wis. Acad. Sci., XXI, pp. 415–594, Pls. XVI–XLIII.

1926. 'The rotifer fauna of Wisconsin, III. A Revision of the genera *Monostyla* and *Lecane*.' Trans. Wis. Acad. Sci., XXII, pp. 315–423, PLS. VIII–LXVII.

1929. 'The rotifer fauna of Wisconsin, IV. The Dicranophorinae.' Trans. Wis. Acad. Sci., XXIII, pp. 667–808, Pls. XXII–XLIX.

MYERS, F. J. 1930. 'The rotifer fauna of Wisconsin, V. The genera *Euchlanis* and *Monommata*.' Trans. Wis. Acad. Sci., XXV, pp. 353–413, Pls. X–XXVI.

1931. 'The distribution of Rotifera on Mount Desert Island.' American Museum Novitates, No. 494, pp. 1–12.

1933. 'The distribution of Rotifera on Mount Desert Island, II.' American Museum Novitates, No. 659, pp. 1–26, Figs. 1–14.

REMANE, A. 1929. 'Intrazelluläre Verdaunung bei Rädertieren.' Zeits. wiss. Biol., Abt. C., II, pp. 146–154, text figs.

1929–1933. 'Rotatorien, Gastrotrichen und Kinorhynchen.' Bronn's 'Kl. und Ordn. des Tierr.,' IV, Abt II, 1, Lief. 1–3, pp. 1–448, Figs. 1–297.